

Abstract of the Disclosure

The invention provides a process for selecting wheat plants and generating wheat lines which exhibit genetically-controlled glyphosate herbicide resistance in the absence of genetic engineering, wheat plants that are glyphosate herbicide resistant, and the naturally-occurring genes that confer glyphosate herbicide resistance exposed by the selection process. The process allows for the identification of wheat germplasm that contains natural glyphosate herbicide resistance genes and for directly isolating individual herbicide resistant plants from that germplasm. Such glyphosate herbicide resistance is genetically-controlled and can be reliably expressed and transferred to other wheat plants by conventional plant breeding methods. In addition the genes that control the herbicide resistance that are identified can be isolated for biotechnological applications to generate glyphosate herbicide resistance in wheat plants that do not contain the natural glyphosate herbicide resistance genes within their germplasm.